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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/761,575	01/21/2004	Yuegang Zhang	ITL.1076US (P18261)	2608
21906	7590	08/08/2006	EXAMINER	
TROP PRUNER & HU, PC 1616 S. VOSS ROAD, SUITE 750 HOUSTON, TX 77057-2631			PHAM, THANHHA S	
			ART UNIT	PAPER NUMBER
			2813	

DATE MAILED: 08/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/761,575

Applicant(s)

ZHANG, YUEGANG

Examiner

Thanhha Pham

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-19 and 21-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-19 and 21-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to Applicant's Amendment dated 5/19/2006.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 17-19 and 28-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Nihey [US 2004/023887].

► With respect to claims 17-19, Nihey (figs 1-2, text pages 1-3) discloses the claimed transistor comprising:

a source region (3, text [0025]) **[claim 17];**

a drain region (4, text [0025]) **[claim 17];**

a plurality of nanotubes (2, text [0025]-[0035]) extending between said source and drain regions, said nanotubes having functionalized ends with attached functional groups (text [0029]: *nanotubes having ends electrically connected to the source and drain, said ends of nanotubes being functionalized (being made to function as electrical connection) with attached functional groups of source and drain*) wherein said nanotubes (2) are parallel to one another and are spaces equidistantly from one another (see fig 2 for details) **[claims 17-19];** and
a gate electrode (6, text [0025]) over said nanotubes (2) **[claim 17].**

► With respect to claims 28-30, Nihey (figs 1-2, text pages 1-3) discloses the claimed transistor comprising:

a source region (3, text [0025]) *[claim 28]*;
a drain region (4, text [0025]) *[claim 28]*;
a plurality of nanotubes (2, text [0025]-[0035]) extending between said source and drain regions, each nanotube including two opposed ends, the opposed ends having different functional groups (source and drain) attached to the opposed (text [0029]: *nanotubes having opposed ends respectively electrically connected to the source and drain, said opposed ends of nanotubes having different functional groups (source and drain are different functional groups) attached to the opposed*) wherein said nanotubes (2) are parallel to one another and are spaces equidistantly from one another (see fig 2 for details) *[claims 28-30]*.

► With respect to claims 21 and 31, said nanotubes (2, fig 2) of Nihey have functionalized ends for the transistor's operation. Said nanotubes (2) of Nihey have opposed first functionalized ends coupled with said source region (3) and second functionalized ends coupled to said drain region (4), said first functionalized ends attracted to said source region and not said drain region.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 22-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nihey [US 2004/0238887] in view of Luyken et al [US 2003/0148562].

► With respect to claims 22-26, Nihey (figs 1-2, text pages 1-3) discloses the claimed transistor comprising:

a source region (3, text [0025]) *[claim 23]*;

a drain region (4, text [0025]) *[claim 23]*;

a plurality of nanotubes (2, text [0025]-[0035]) extending between said source and drain regions, said nanotubes having functionalized ends (text [0029]: nanotubes having ends electrically connected to the source and drain, said ends of nanotubes being functionalized (being made to function as electrical connection) wherein said nanotubes (2) are parallel to one another and are spaces equidistantly from one another (see fig 2 for details) *[claims 23-26]*; and

a gate electrode (6, text [0025]) over said nanotubes (2) *[claim 23]*.

Nihey does not expressly mention in written the nanotubes are capless *[claim 22]* or open-ended *[claim 23]*.

However, Luyken et al (text [0001]-[0146], particularly text [0038]) teaches the nanotubes used in a transistor can be either capless/open-ended or with cap/closed-end.

Therefore, at the time of invention, it would have been obvious for those skilled in the art, in view of Luyken et al, to select the nanotubes being capless or opened-end as

being claimed as convenient nanotubes in the transistor of Nihey to provide conduction path for carriers between the source and the drain of transistor.

► With respect to claim 27, Nihey shows that nanotubes (2) have opposed first functionalized ends coupled with said source region (3) and second functionalized ends coupled to said drain region (4), said first functionalized ends attracted to said source region and not said drain region.

3. Claims 22-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nihey [US 2004/0238887] in view of Plefferle et al [US 2003/0148086].

► With respect to claims 22-26, Nihey (figs 1-2, text pages 1-3) discloses the claimed transistor comprising:

a source region (3, text [0025]) *[claim 23]*;

a drain region (4, text [0025]) *[claim 23]*;

a plurality of nanotubes (2, text [0025]-[0035]) extending between said source and drain regions, said nanotubes having functionalized ends (text [0029]: nanotubes having ends electrically connected to the source and drain, said ends of nanotubes being functionalized (being made to function as electrical connection) wherein said nanotubes (2) are parallel to one another and are spaces equidistantly from one another (see fig 2 for details) *[claims 23-26]*; and

a gate electrode (6, text [0025]) over said nanotubes (2) *[claim 23]*.

Nihey does not expressly mention in written the nanotubes are capless [*claim 22*] or open-ended [*claim 23*].

However, Plefferle et al (text [0001]-[0073], particularly text [0006]-[0018], [0058]-[0064] & [0071]-[0073]) discloses nanotubes with ends being capless/open-ended and being functionalized as improved nanotubes with controllable physical and electronic characteristics that can be used in transistor.

Therefore, at the time of invention, it would have been obvious for those skilled in the art to modify the transistor of Nihey by using the nanotubes with ends as being claimed, per taught by Plefferle et al, to provide a transistor with controllable electrical characteristic operation.

► With respect to claim 27, Nihey shows that nanotubes (2) have opposed first functionalized ends coupled with said source region (3) and second functionalized ends coupled to said drain region (4), said first functionalized ends attracted to said source region and not said drain region.

Response to Arguments

4. Applicant's arguments filed on 5/19/2006 have been fully considered but they are not persuasive.

In regard to Applicant's argument that there is no rationale to modify the cited references to use open-ended nanotube, the argument is not persuasive since Luyken et al teaches the nanotube can have the ends being either open or close to use in transistor. Therefore, the choice of using open-ended/capless nanotube would be

obvious for those skilled in the art, per taught by Luyken et al. In addition, Plefferle et al teaches using nanotubes with ends being capless/open-ended and being functionalized as improved nanotubes with controllable physical and electronic characteristics that can be used in transistor. The choice of using open-ended/capless nanotube would be obvious for those skilled in the art, per taught by Plefferle et al, to provide a transistor with controllable electrical characteristic operation.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

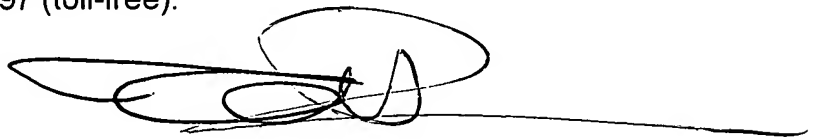
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-

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1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, consisting of a series of loops and a long horizontal stroke extending to the right.

TSP

THANHHA S. PHAM
PRIMARY EXAMINER